

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 17, 20, 30, 44, and 54 as provided below:

1. (currently amended) A wire gripping device for a welding wire feeder, said gripping device comprising: a support member, a first pinch roll mounted on said support member, a lever arm pivotally connected to said support member, and having a second pinch roll mounted thereon for pivotal displacement therewith toward said first pinch roll to grip a wire therebetween, and an adjustable spring device between said support member and said lever for biasing said second pinch roll toward said first pinch roll to produce a gripping force on a wire therebetween, said spring device including a first member, a second member displaceable toward and away from said first member along a stroke of said spring device, and a spring mechanism between said first and second members, said spring mechanism having at least a first and a second spring modulus for producing said gripping force as said first and second members are displaced toward one another along said stroke, said spring mechanism applying a first range of gripping forces along a first portion of said stroke with the force produced by said first spring modulus and a second range of gripping forces along a second portion of said stroke with force produced by said second spring modulus.

2. (original) The gripping device of claim 1, wherein said spring mechanism includes at least a first and a second spring.

3. (original) The gripping device of claim 2, wherein said first and second springs are compression springs, said first spring having a first spring height and said second spring having a second spring height, said first and second spring heights being unequal.

4. (original) The gripping device of claim 1, wherein said spring mechanism includes a spring having at least two spring moduli.

5. (original) The gripping device of claim 1, wherein said spring mechanism includes a plurality of springs each having a uniform spring rate.

6. (original) The gripping device of claim 1, wherein said spring mechanism includes a variable rate spring.

7. (previously presented) The gripping device of claim 1, wherein said spring mechanism includes a first and a second spring, said first spring having a first spring height and a first spring diameter, said second spring having a second spring height and a second spring diameter, said first and second spring heights being unequal, and said first and second spring diameters being unequal such that one of said first and second springs is positionable within the other.

8. (previously presented) The gripping device of claim 7, wherein said adjustable spring device further includes a post, said post being pivotally connected to said support member at a first end to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member.

9. (original) The gripping device of claim 8, wherein said first and second members are elongated members having a spring pocket for receiving said first and second springs, said spring pocket at least partially enclosing said first and second springs.

10. (original) The gripping device of claim 8, wherein said first and second members are mounted on said post and said first and second springs are coaxial with said post.

11. (original) The gripping device of claim 1, wherein said spring device further includes a cylinder post, said cylinder post being connected to said support member at a first end and threadingly engaging with said second member to enable said displacement of said second member toward and away from said first member.

12. (previously presented) The gripping device of claim 11, wherein said first end of said cylinder post is pivotally connected to said support member to allow pivotal movement of the post between a drive position and a released position.

13. (previously presented) A wire gripping device for a welding wire feeder, said gripping device comprising: a support member, a first pinch roll mounted on said support member, a

lever arm pivotally connected to said support member, and having a second pinch roll mounted thereon for pivotal displacement therewith toward said first pinch roll to grip a wire therebetween, and an adjustable spring device between said support member and said lever for biasing said second pinch roll toward said first pinch roll to produce a gripping force on a wire therebetween, said spring device including a first member, a second member displaceable toward and away from said first member, and a spring mechanism between said first and second members, said spring mechanism having at least a first and a second spring modulus for producing said gripping force as said first and second members are displaced toward one another, said spring mechanism applying a first range of gripping forces with the force produced by said first spring modulus and a second range of gripping forces with force produced by said second spring modulus; wherein said spring device further includes a cylinder post, said cylinder post being connected to said support member at a first end to allow pivotal movement of said post between a drive position and a released position, said post threadingly engaging with said second member to enable said displacement of said second member toward and away from said first member, said first member having an end wall facing said lever arm, one of said end wall and said support member including a locking ridge and the other of said end wall and said lever arm including a locking groove, said locking ridge engaging said locking groove to retain said spring device in said drive position.

14. (previously presented) A wire gripping device for a welding wire feeder, said gripping device comprising: a support member, a first pinch roll mounted on said support member, a lever arm pivotally connected to said support member, and having a second pinch roll mounted thereon for pivotal displacement therewith toward said first pinch roll to grip a wire therebetween, and an adjustable spring device between said support member and said lever for biasing said second pinch roll toward said first pinch roll to produce a gripping force on a wire therebetween, said spring device including a first member, a second member displaceable toward and away from said first member, and a spring mechanism between said first and second members, said spring mechanism having at least a first and a second spring modulus for producing said gripping force as said first and second members are displaced toward one another, said spring mechanism applying a first range of gripping forces with the force produced by said first spring modulus and a second range of gripping forces with force produced by said second spring modulus; wherein said first and second members are elongated members having a spring pocket for receiving said spring mechanism, said spring

pocket at least partially enclosing said spring mechanism, said first and second members including a first and a second side wall respectively with respective first and second outer surfaces, one of said first and second outer surfaces including adjustment graduations.

15. (previously presented) The gripping device of claim 1, wherein said adjustable spring device has a spring device axis and further includes a post coaxial with said axis, said post being pivotally connected to said support member at a first end to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member, said first and second members being elongated members coaxial with said spring device axis and having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism.

16. (previously presented) The gripping device of claim 15, wherein said first member further includes an end wall facing said lever arm with a through hole, said post extending through said hole.

17. (currently amended) The gripping device of claim 1, wherein said adjustable spring device further includes a post, said post being pivotally connected to said support member at a first end to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member, said first and second ~~member~~members are elongated members having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism, said second member further including a top with a thread extender extending downwardly from said top into said spring pocket.

18. (original) The gripping device of claim 17, wherein said first member further includes a bottom, said spring device including at least one compression spring extending between said top and bottom within said spring pocket, a portion of said at least one spring extending about said thread extender.

19. (previously presented) The gripping device of claim 1, wherein said lever is pivotally connected to said support member at a first end and said spring device engages said lever arm at a second end, said second pinch roller being rotatably connected to said lever between said first and second ends.

20. (currently amended) A compression cylinder for a set of pinch rollers in a welding wire feeder wherein the wire passes between the pinch rollers which engage the wire with a gripping force, said cylinder comprising: a first member; a second member displaceable relative to said first member along a stroke of said cylinder; and a spring mechanism extending between said first and second members having at least a first and a second spring modulus, said spring mechanism producing said gripping force as said first and second members are displaced relative to one another along said stroke, said cylinder urging one roller of the set of pinch rollers toward the other to apply the gripping force, and said cylinder applying a first range of gripping forces along a first portion of said stroke with force produced by said first spring modulus and a second range of gripping forces along a second portion of said stroke with force produced by said second spring modulus.

21. (previously presented) The compression cylinder of claim 20, wherein said spring mechanism includes at least a first and a second spring.

22. (previously presented) The compression cylinder of claim 21, wherein said first and second springs are compression springs, said first spring having a first spring height and said second spring having a second spring height, said first and second spring heights being unequal.

23. (previously presented) The compression cylinder of claim 20, wherein said spring mechanism includes a spring having at least two spring moduli.

24. (previously presented) The compression cylinder of claim 20, wherein said spring mechanism includes a variable rate spring.

25. (previously presented) The compression cylinder of claim 20, wherein said spring mechanism includes a first and a second spring, said first spring having a first spring height

and a first spring diameter, said second spring having a second spring height and a second spring diameter, said first and second spring heights being unequal, and said first and second spring diameters being unequal such that one of said first and second springs is positionable within the other.

26. (previously presented) The compression cylinder of claim 20, further comprising a post, said post being pivotally connectable to a support member of the wire feeder at a first end thereof to allow pivotal movement of said post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member.

27. (previously presented) The compression cylinder of claim 21, wherein said first and second members are elongated members having a spring pocket for receiving said first and second springs, said spring pocket at least partially enclosing said first and second springs.

28. (previously presented) A compression cylinder for a set of pinch rollers in a welding wire feeder wherein the wire passes between the pinch rollers which engage the wire with a gripping force, said cylinder comprising: a first member; a second member displaceable relative to said first member; and a spring mechanism extending between said first and second members having at least a first and a second spring modulus, said spring mechanism producing said gripping force as said first and second members are displaced relative to one another, said cylinder urging one roller of the set of pinch rollers toward the other to apply the gripping force, and said cylinder applying a first range of gripping forces with force produced by said first spring modulus and a second range of gripping forces with force produced by said second spring modulus; wherein said spring device further includes a cylinder post, said cylinder post being connectable to a support member of the wire feeder at a first end thereof to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging with said second member to enable said displacement of said second member toward and away from said first member, said first member having an end wall facing said lever arm, one of said end wall and said support member including a locking ridge and the other of said end wall and said lever arm including a locking groove, said locking ridge engaging said locking groove to retain said spring device in said drive position.

29. (previously presented) A compression cylinder for a set of pinch rollers in a welding wire feeder wherein the wire passes between the pinch rollers which engage the wire with a gripping force, said cylinder comprising: a first member; a second member displaceable relative to said first member; and a spring mechanism extending between said first and second members having at least a first and a second spring modulus, said spring mechanism producing said gripping force as said first and second members are displaced relative to one another, said cylinder urging one roller of the set of pinch rollers toward the other to apply the gripping force, and said cylinder applying a first range of gripping forces with force produced by said first spring modulus and a second range of gripping forces with force produced by said second spring modulus; wherein said first and second members are elongated members having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism, said first and second members including a first and a second side wall respectively with respective first and second outer surfaces, one of said first and second outer surfaces including adjustment graduations.

30. (currently amended) The compression cylinder of claim 20, ~~wherein said adjustable spring device further includes~~further comprising a post, said post being pivotally connectable to a support member of the wire feeder at a first end thereof to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member, said first and second members elongated members having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism, said second member further including a top with a thread extender extending downwardly from said top into said spring pocket.

31. (previously presented) The gripping device of claim 13, wherein said spring mechanism includes at least a first and a second spring.

32. (previously presented) The gripping device of claim 31, wherein said first and second springs are compression springs, said first spring having a first spring height and said second spring having a second spring height, said first and second spring heights being unequal.

33. (previously presented) The gripping device of claim 13, wherein said spring mechanism includes a spring having at least two spring moduli.

34. (previously presented) The gripping device of claim 13, wherein said spring mechanism includes a plurality of springs each having a uniform spring rate.

35. (previously presented) The gripping device of claim 13, wherein said spring mechanism includes a variable rate spring.

36. (previously presented) The gripping device of claim 13, wherein said spring mechanism includes a first and a second spring, said first spring having a first spring height and a first spring diameter, said second spring having a second spring height and a second spring diameter, said first and second spring heights being unequal, and said first and second spring diameters being unequal such that one of said first and second springs is positionable within the other.

37. (previously presented) The gripping device of claim 36, wherein said adjustable spring device further includes a post, said post being pivotally connected to said support member at a first end to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member.

38. (previously presented) The gripping device of claim 37, wherein said first and second members are elongated members having a spring pocket for receiving said first and second springs, said spring pocket at least partially enclosing said first and second springs.

39. (previously presented) The gripping device of claim 37, wherein said first and second members are mounted on said post and said first and second springs are coaxial with said post.

40. (previously presented) The gripping device of claim 13, wherein said spring device further includes a cylinder post, said cylinder post being connected to said support member at a first end and threadingly engaging with said second member to enable said displacement of said second member toward and away from said first member.

41. (previously presented) The gripping device of claim 40, wherein said first end of said cylinder post is pivotally connected to said support member to allow pivotal movement of the post between a drive position and a released position.

42. (previously presented) The gripping device of claim 13, wherein said adjustable spring device has a spring device axis and further includes a post coaxial with said axis, said post being pivotally connected to said support member at a first end to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member, said first and second members being elongated members coaxial with said spring device axis and having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism.

43. (previously presented) The gripping device of claim 42, wherein said first member further includes an end wall facing said lever arm with a through hole, said post extending through said hole.

44. (currently amended) The gripping device of claim 13, wherein said adjustable spring device further includes a post, said post being pivotally connected to said support member at a first end to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member, said first and second ~~member~~members are elongated members having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism, said second member further including a top with a thread extender extending downwardly from said top into said spring pocket.

45. (previously presented) The gripping device of claim 44, wherein said first member further includes a bottom, said spring device including at least one compression spring extending between said top and bottom within said spring pocket, a portion of said at least one spring extending about said thread extender.

46. (previously presented) The gripping device of claim 13, wherein said lever is pivotally connected to said support member at a first end and said spring device engages said lever arm at a second end, said second pinch roller being rotatably connected to said lever between said first and second ends.

47. (previously presented) The compression cylinder of claim 29, wherein said spring mechanism includes at least a first and a second spring.

48. (previously presented) The compression cylinder of claim 47, wherein said first and second springs are compression springs, said first spring having a first spring height and said second spring having a second spring height, said first and second spring heights being unequal.

49. (previously presented) The compression cylinder of claim 29, wherein said spring mechanism includes a spring having at least two spring moduli.

50. (previously presented) The compression cylinder of claim 29, wherein said spring mechanism includes a variable rate spring.

51. (previously presented) The compression cylinder of claim 29, wherein said spring mechanism includes a first and a second spring, said first spring having a first spring height and a first spring diameter, said second spring having a second spring height and a second spring diameter, said first and second spring heights being unequal, and said first and second spring diameters being unequal such that one of said first and second springs is positionable within the other.

52. (previously presented) The compression cylinder of claim 29, further comprising a post, said post being pivotally connectable to a support member of the wire feeder at a first end thereof to allow pivotal movement of said post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member.

53. (previously presented) The compression cylinder of claim 47, wherein said first and second members are elongated members having a spring pocket for receiving said first and second springs, said spring pocket at least partially enclosing said first and second springs.

54. (currently amended) The compression cylinder of claim 29, ~~wherein said adjustable spring device further includes~~further comprising a post, said post being pivotally connectable to a support member of the wire feeder at a first end thereof to allow pivotal movement of the post between a drive position and a released position, said post threadingly engaging said second member to enable said displacement thereof toward and away from said first member, said first and second members being elongated members having a spring pocket for receiving said spring mechanism, said spring pocket at least partially enclosing said spring mechanism, said second member further including a top with a thread extender extending downwardly from said top into said spring pocket.